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### **REMARKS**

This application is a divisional of allowed U. S. Patent Application 10/234,577, filed on August 30, 2002 ("the parent application"). The foregoing amendments and the following comments are responsive to the objections and rejections set forth by the Examiner in the July 13, 2004 Office Action.

Claims 1-49 are pending in this application. The Examiner rejected Claims 1-49. In particular, the Examiner rejected Claims 34, 35, and 42 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,957,590 ("the Douglas patent"). The Examiner further rejected Claims 1, 2, 8-14, 20-26, 32-35, and 41-44 under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Publication No. 06-021440 ("the Abido patent") in view of the Douglas patent. The Examiner further rejected Claims 3-5, 7, 15-17, 19, 27-29, 31, 36-38, 40, 45-47, and 49 under 35 U.S.C. § 103(a) as being unpatentable over the Abido patent in view of the Douglas patent and further in view of U.S. Patent No. 6,376,348 ("the Schrems patent"). The Examiner further rejected Claims 6, 18, 30, 39, and 48 under 35 U.S.C. § 103(a) as being unpatentable over the Abido patent in view of the Douglas patent and further in view of the Schrems patent and U.S. Patent No. 6,097,60 ("the Tsuchida patent").

Reconsideration of the application is respectfully requested.

### **REJECTION OF CLAIMS 34, 35, and 42-44 UNDER 35 U.S.C. § 102(b)**

The Examiner rejected Claims 34, 35, and 42-44 under 35 U.S.C. § 102(b) as being anticipated by Douglas. In view of the following discussion, Applicant respectfully traverses this rejection.

Applicant respectfully submits that the claims as previously pending are patentably distinguished over the Douglas patent.

#### **Claim 34**

In an embodiment of the invention, an etch removes titanium oxynitride extrusions protruding from the sides of the titanium silicide layer in a semiconductor stack. The extrusions form by reacting pockets of titanium found in the titanium silicide layer with oxygen and nitrogen from the semiconductor processing steps.

In contrast, Douglas appears to teach forming a titanium oxynitride layer and etching to remove all remnants or filaments of the titanium oxynitride layer from the upper surface or top of the underlying layer. Douglas does not teach titanium oxynitride extrusions forming on the

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exposed sides of the semiconductor structure. Further, Douglas does not teach etching titanium oxynitride extrusions formed on the exposed sides of the semiconductor structure.

Because the reference cited by the Examiner does not disclose, teach or suggest a semiconductor stack having at least a side comprising a titanium silicide layer, where the titanium silicide layer has substantially etched titanium oxynitride extrusions formed on the side thereof, Applicant asserts that Claim 34 is not anticipated by Douglas. Applicant therefore respectfully submits that Claim 34 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 34.

#### **Claims 35 and 42**

Claims 35 and 42, which depend from Claim 34, are believed to be patentable for the same reasons articulated above with respect to Claim 34, and because of the additional features recited therein.

#### **Claim 43**

In an embodiment of the invention, an etch removes metal oxynitride extrusions protruding from the sides of the metal silicide layer in a semiconductor stack. The extrusions form by reacting pockets of metal found in the metal silicide layer with oxygen and nitrogen from the semiconductor processing steps.

In contrast, Douglas appears to teach forming a titanium oxynitride layer and etching to remove all remnants or filaments of the titanium oxynitride layer from the upper surface or top of the underlying layer. Douglas does not teach metal oxynitride extrusions forming on the exposed sides of the semiconductor structure. Further, Douglas does not teach etching metal oxynitride extrusions formed on the exposed sides of the semiconductor structure.

Because the reference cited by the Examiner does not disclose, teach or suggest a semiconductor stack having at least a side comprising a metal silicide layer, where the metal silicide layer has substantially etched metal oxynitride extrusions formed on the side thereof, Applicant asserts that Claim 43 is not anticipated by Douglas. Applicant therefore respectfully submits that Claim 43 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 43.

#### **Claim 44**

Claim 44, which depends from Claim 43, is believed to be patentable for the same reasons articulated above with respect to Claim 43, and because of the additional features recited therein.

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**REJECTION OF CLAIMS 1, 2, 8-14, 20-26, 32-35, and 41-44 UNDER 35 U.S.C. § 103(a)**

The Examiner rejected Claims 1, 2, 8-14, 20-26, 32-35, and 41-44 under 35 U.S.C. § 103 as being unpatentable over Abido in view of Douglas. In view of the following discussion, Applicant respectfully traverses this rejection.

Applicants respectfully submit that the claims as previously pending are patentably distinguished over the Abido patent, the Douglas patent, the other cited references, or any combination thereof.

**Claims 1 and 13**

In an embodiment of the invention, an etch removes metal oxynitride extrusions protruding from the sides of the metal silicide layers in a semiconductor structure. The extrusions form by reacting pockets of metal found in the metal silicide layers with oxygen and nitrogen from the semiconductor processing steps.

In contrast, Douglas appears to teach forming a titanium oxynitride layer and etching to remove all remnants or filaments of the titanium oxynitride layer from the upper surface or top of the underlying layer. Douglas does not teach forming a barrier layer, nor does Douglas teach metal oxynitride extrusions forming on the exposed sides of the semiconductor structure. While Abido teaches forming a barrier layer, Abido does not appear to teach any extrusions forming on the semiconductor device.

Thus, there is no suggestion or motivation to combine the Douglas reference with the Abido reference to remove extrusions formed on the exposed sides of the barrier layer and the conductive layer. Also, because neither the Douglas reference, nor the Abido reference, teaches or suggests any extrusion formed on the exposed side of the semiconductor device, the Examiner has not provided prior art that teaches all the claim limitations.

The references cited by the Examiner do not disclose, teach or suggest a semiconductor structure comprising a barrier layer above a polysilicon layer, the barrier layer comprising metal silicide or tungsten silicide, where the barrier layer has substantially etched metal oxynitride extrusions or tungsten oxynitride extrusions, respectively, formed on the side thereof. Further, the references cited by the Examiner do not disclose, teach or suggest a conductive layer above the barrier layer, the conductive layer comprising metal silicide or titanium silicide, where the conductive layer has substantially etched metal oxynitride extrusions or titanium oxynitride extrusions, respectively, formed on the side thereof. Applicant asserts that Claims 1 and 13 are not obvious in view of the Douglas and Abido references. Applicant

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therefore respectfully submits that Claims 1 and 13 are patentably distinguished over the cited references and Applicant respectfully requests allowance of Claims 1 and 13.

**Claims 2 and 8-12**

Claims 2 and 8-12, which depend from Claim 1, are believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

**Claims 14 and 20-24**

Claims 14 and 20-24, which depend from Claim 13, are believed to be patentable for the same reasons articulated above with respect to Claim 13, and because of the additional features recited therein.

**Claims 25, 34, and 43**

In an embodiment of the invention, an etch removes metal oxynitride extrusions protruding from the sides of the metal silicide layer in a semiconductor stack. The extrusions form by reacting pockets of metal found in the metal silicide layers with oxygen and nitrogen from the semiconductor processing steps.

In contrast, Douglas appears to teach forming a titanium oxynitride layer and etching to remove all remnants or filaments of the titanium oxynitride layer from the upper surface or top of the underlying layer. Douglas does not teach forming a barrier layer, nor does Douglas teach metal oxynitride extrusions forming on the exposed sides of the semiconductor structure. While Abido teaches forming a barrier layer, Abido does not appear to teach any extrusions forming on the semiconductor device.

Thus, there is no suggestion or motivation to combine the Douglas reference with the Abido reference to remove extrusions formed on the exposed sides of the barrier layer and the conductive layer. Also, because neither the Douglas reference, nor the Abido reference, teaches or suggests any extrusion formed on the exposed side of the semiconductor device, the Examiner has not provided prior art that teaches all the claim limitations.

Because the references cited by the Examiner do not disclose, teach or suggest a semiconductor stack comprising a metal silicide layer, a tungsten silicide layer, or a titanium silicide layer, where the layer has substantially etched metal oxynitride extrusions, tungsten oxynitride extrusions, or titanium oxynitride extrusions, respectively, formed on the side thereof, Applicant asserts that Claims 25, 34, and 43 are not obvious in view of the Douglas and Abido references. Applicant therefore respectfully submits that Claims 25, 34, and 43 are patentably

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distinguished over the cited references and Applicant respectfully requests allowance of Claims 25, 34, and 43.

**Claims 26, 32, and 33**

Claims 26, 32, and 33, which depend from Claim 25, are believed to be patentable for the same reasons articulated above with respect to Claim 25, and because of the additional features recited therein.

**Claims 35, 41, and 42**

Claims 35, 41, and 42, which depend from Claim 34, are believed to be patentable for the same reasons articulated above with respect to Claim 34, and because of the additional features recited therein.

**Claim 44**

Claim 44, which depends from Claim 43, is believed to be patentable for the same reasons articulated above with respect to Claim 43, and because of the additional features recited therein.

**REJECTION OF CLAIMS 3-5, 7, 15-17, 19, 27-29, 31, 36-38, 40, 45-47, and 49 UNDER 35 U.S.C. § 103(a)**

The Examiner rejected Claims 3-5, 7, 15-17, 19, 27-29, 31, 36-38, 40, 45-47, and 49 under 35 U.S.C. § 103(a) as being unpatentable over Abido in view of Douglas and further in view of Schrems. In view of the above discussion, Applicant respectfully traverses this rejection.

Applicants respectfully submit that the claims as previously pending are patentably distinguished over the Abido patent, the Douglas patent, the Schrems patent, the other cited references or any combination thereof.

**Claims 3-5, and 7**

Claims 3-5, and 7, which depend from Claim 1, are believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

**Claims 15-17, and 19**

Claims 15-17, and 19, which depend from Claim 13, are believed to be patentable for the same reasons articulated above with respect to Claim 13, and because of the additional features recited therein.

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**Claims 27-29, and 31**

Claims 27-29, and 31, which depend from Claim 25, are believed to be patentable for the same reasons articulated above with respect to Claim 25, and because of the additional features recited therein.

**Claims 36-38, and 40**

Claims 36-38, and 40, which depend from Claim 34, are believed to be patentable for the same reasons articulated above with respect to Claim 34, and because of the additional features recited therein.

**Claims 45-47, and 49**

Claims 45-47, and 49, which depend from Claim 43, are believed to be patentable for the same reasons articulated above with respect to Claim 43, and because of the additional features recited therein.

**REJECTION OF CLAIMS 6, 18, 30, 39, and 48 UNDER 35 U.S.C. § 103(a)**

The Examiner further rejected Claims 6, 18, 30, 39, and 48 under 35 U.S.C. § 103(a) as being unpatentable over Abido in view of Douglas and further in view of Schrems and Tsuchida. In view of the above discussion, Applicant respectfully traverses this rejection.

Applicants respectfully submit that the claims as previously pending are patentably distinguished over the Abido patent, the Douglas patent, the Schrems patent, the Tsuchida patent, the other cited references, or any combination thereof.

**Claim 6**

Claim 6, which depends from Claim 1, is believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

**Claim 18**

Claim 18, which depends from Claim 13, is believed to be patentable for the same reasons articulated above with respect to Claim 13, and because of the additional features recited therein.

**Claim 30**

Claim 30, which depends from Claim 25, is believed to be patentable for the same reasons articulated above with respect to Claim 25, and because of the additional features recited therein.

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**Claim 39**

Claim 39, which depends from Claim 34, is believed to be patentable for the same reasons articulated above with respect to Claim 34, and because of the additional features recited therein.

**Claim 48**

Claim 48, which depends from Claim 43, is believed to be patentable for the same reasons articulated above with respect to Claim 43, and because of the additional features recited therein.

**REQUEST FOR TELEPHONE INTERVIEW**

Pursuant to M.P.E.P § 713.01, in order to expedite prosecution of this application, Applicant's undersigned agent of record hereby formally requests a telephone interview with the Examiner as soon as the Examiner has considered the effect of the arguments presented above. Applicant's agent can be reached at (949) 721-2988 or at the number listed below.

**CONCLUSION**

In view of the forgoing, the present application is believed to be in condition for allowance, and such allowance is respectfully requested. If further issues remain to be resolved, the Examiner cordially invited to contact the undersigned such that any remaining issues may be promptly resolved. Also, please charge any additional fees, including any fees for additional extension of time or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: October 13, 2004

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